

In re Application of:  
Randall Ho et al.  
Application No.: 09/929,295  
Filed: August 13, 2001  
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PATENT  
Docket No.: EYEM1360

### REMARKS

In the pending Office Action, claim 4 was rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over U.S. patent number 6,072,496 to Guenter et al in view of U.S. patent number 6,611,268 to Szeliski et al. Claims 5-6 were rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over the Guenter patent in view of U.S. patent number 5,828,769 to Burns.

Claims 1-3 are canceled herein, without prejudice.

Applicants respectfully traverse each of the rejections and respectfully request reconsideration of this application in light of the following remarks.

The rejection of independent claim 4 as allegedly unpatentable over the Guenter patent in view of the Szeliski patent is respectfully traversed. In the Office Action, the Examiner notes that "Guenter does not explicitly call for texture mapping the warped image frame onto the shaped head mesh to generate a three-dimensional frame head associated with the respective video image frame. However, in the same field of endeavor, Szeliski teaches this feature (see col. 26, lines 24-42) . . . . The suggestion/motivation for doing so would have been to construct three-dimensional video image from two or more images." See Office Action, page 3, lines 8-15.

Applicant responds by pointing out that claim 4 recites "for each two-dimensional video image frame: sensing the locations of the actor's facial features at predetermined node locations in the two-dimensional video image frame, wherein each node location is associated with a particular facial feature; driving control points on a three-dimensional head mesh based on the sensed node locations in the two-dimensional video image frame to generate a shaped three-dimensional head mesh; warping the two-dimensional video image frame used to generate the sensed node locations for projection onto the shaped head mesh; and texture mapping the warped two-dimensional video image frame onto the shaped head mesh to generate a three-dimensional frame head associated with the respective two-dimensional video image frame". "The three-dimensional video head" is animated "by displaying a sequence of the three-dimensional frame heads associated with the sequence of two-dimensional video image frames."

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The Guenter patent discloses using six cameras to capture six camera views of an actor's face. See, column 6, lines 2-7. The 2D locations in the six different camera views are processed to reconstruct 3D control points for each frame of a video sequence. See, column 6, lines 45-67. The invention recited in claims 4 has a three-dimensional frame head generated from a warped two-dimensional video image frame. The same two-dimensional video image frame was used to drive control points on a three-dimensional head mesh based on the sensed node locations in the two-dimensional video image frame. The Guenter patent fails to disclose driving control points on a three-dimensional head mesh based on the sensed node locations in the two-dimensional video image frame to generate a shaped three-dimensional head mesh, warping the two-dimensional video image frame used to generate the sensed node locations for projection onto the shaped head mesh, and texture mapping the warped two-dimensional video image frame onto the shaped head mesh to generate a three-dimensional frame head associated with the respective two-dimensional video image frame, as recited in claim 4.

Similar to the Guenter patent, the Szeliski patent discloses "[r]eferring to FIG. 17, this 3D Video Texture can be constructed by first simultaneously videotaping an object (which could be a person) from two or more different cameras positioned at different location (process action 1700). For example, in a tested embodiment of this system, the three different video cameras were placed facing a subject at about 20 degrees apart." See, column 26, lines 36-42. Thus, the Szeliski patent uses a 3D representation to drive the control points. Accordingly, the Szeliski patent fails to remedy the disclosure deficiencies of the Guenter patent.

Regarding the Examiner assertion of suggestion/motivation to construct a three-dimensional video image from two or more images, claim 4 recites no such feature. Claim 4 does not require "two or more images" since the same two-dimensional image frame is used for sensing, and then is warped and texture mapped, which is not suggested or disclosed by the Guenter and Szeliski patents.

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Therefore, independent claim 4 defines a patentable advance over the Guenter and Szeliski patents, and independent claim 4 should now be allowed.

The rejection of claim 5, which depends on independent claim 4, as allegedly unpatentable over the Guenter patent in view of the Burns patent is respectfully traversed. Claim 5 recites that facial feature location sensing is performed using facial image frames generated using wavelet transformations. The Burns patent briefly mentions Gabor wavelets in a background discussion related to moment-based approaches to image recognition. The Burns patent then immediately teaches that a "shortcoming to moment-based recognition, however, is the instability of moments with respect to occlusions, image clutter and other disruptions, for example. As a result, moments traditionally have been used to detect objects that are relatively isolated or in silhouette form." See, column 3, lines 1-5. Applicants assert that the Burns patent, taken as a whole, fails to motivate one skilled in the art to combine the teachings of the Burns patent with the teaching of the Guenter patent. In the Office, the Examiner asserts that the "motivation for doing so is to provide visual recognition of an object of an image under variations of three dimensional position and orientation of the object." See, Office Action, page 3. Applicant's representative is unable to locate any discussion in the Burns patent describing the advantages asserted by the Examiner. The showing of motivation to combine references is an essential component of an obviousness holding, and the factual inquiry of whether to combine references must be thorough, searching, and based on objective evidence of record. See, In re Lee, 61 U.S.P.Q.2d 1430 (Fed. Cir. 2002). Further, reliance on conclusory statements related to motivation to combine references without setting forth the rationale on which the conclusory statements rely violates the agency obligations under the Administrative Procedure Act. Id. Applicants asserts that the stated rejections fail to make the requisite showing of motivation to combine the cited references, and to set forth the objective evidence of record supporting the showing of motivation to combine the references. For these reasons, and the

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reasons given above with respect to independent claim 4, the rejection of claim 5 is improper, and claim 5 should now be allowed.

The rejection of claim 6, which depends on independent claim 4, as allegedly unpatentable over the Guenter patent in view of the Burns patent is respectfully traversed. Claim 6 recites that facial feature location sensing is performed using facial image frames generated using Gabor wavelet transformations. For the reasons given above with respect to claim 5, claim 6 likewise should now be allowed.

New claim 7 recites that "each two-dimensional image frame in the sequence of two-dimensional video image frames has only one view of the actor's face". Figure 3 clearly shows that each two-dimensional image frame in the sequence of two-dimensional video image frames has only one view of the actor's face.

### CONCLUSION

In view of the above remarks, reconsideration and prompt evaluation of all pending claims are respectfully requested. If any questions or issues remain, the Examiner is invited to contact the undersigned at the telephone number set forth below so that prosecution of this application can proceed in an expeditious fashion.

Respectfully submitted,

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